ESI

EnviroSystems, Inc.
P.O. Box 778
Hampton, NH 03843-0778
603-926-3345

September 12, 2014

Ms. Teresa O'Callaghan
United Water
Hull Water Pollution Control Facility
1111 Nantasket Avenue
Hull, Massachusetts 02045

Dear Ms. O'Callaghan:

Enclosed, please find a copy of our report presenting the results of a toxicity test completed using an effluent sample collected from the Hull, Massachusetts Water Pollution Control Facility during the August 2014 sampling period. Acute toxicity was evaluated using the inland silverside, *Menidia beryllina*.

Please note that the *M. beryllina* assay started on August 8, 2014 did not meet the test acceptability criterion for minnow survival in the laboratory control and several effluent concentrations. The assay was successfully repeated starting September 9, 2014. Results from the original failed assay can be found in the data appendix.

Please do not hesitate to call me, Kirk Cram or Petra Karbe should you have any questions regarding the report.

Sincerely,

EnviroSystems, Incorporated

Kenneth A. Simon
Technical Director

Enclosure
WET Test Report Certification
Report Number 24925 / 25062-14-08
One (1) copy + email

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION

Permittee Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: _____ _____

Authorized Signature

_____

Print or Type Name

Hull Permanent Sewer Commission

Print or Type the Permittee's Name

MA0101231

Type or Print the NPDES Permit No.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: September 12, 2014 _____

Kenneth A. Simon
Technical Director - EnviroSystems, Inc.

TOXICOLOGICAL EVALUATION
OF A TREATED MUNICIPAL EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
August and September 2014

Hull Water Pollution Control Facility
Hull, Massachusetts
NPDES Permit Number MA0101231

Prepared For:

United Water
Hull Water Pollution Control Facility
1111 Nantasket Avenue
Hull, Massachusetts 02045

Prepared By:

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

August and September 2014
Reference Number Hull 24925 / 25062-14-08

STUDY NUMBER 24925 / 25062

EXECUTIVE SUMMARY

The following summarizes the results of an acute exposure bioassay completed during August 2014 in support of the NPDES biomonitoring requirements of the Hull, Massachusetts Water Pollution Control Facility, operated by United Water. The 48 hour acute definitive assay was completed using the inland silverside, *Menidia beryllina*.

M. beryllina were 10 days old at the start of the test. Dilution water was receiving water collected from Massachusetts Bay at a point away from the discharge.

Samples were received under chain of custody in good order. All sample receipt, test conditions and control endpoints were within protocol specifications except where otherwise noted. The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s), and are intended to be used only by the submitter.

Results from the acute exposure assay and their relationship to permit limits are summarized in the following matrix.

Acute Toxicity Evaluation

Species	Exposure	LC-50	A-NOEC	Permit Limit (LC-50)	Effluent Meets Permit Limit	Assay Meets Protocol Limits
Menidia beryllina	48 Hours	>100%	NC	≥100%	Yes	Yes*

COMMENTS:
NC - Not Calculated.
* The diluent Receiving Water control and the Sodium Thiosulfate control did not meet the minimum test acceptability criteria for minnow survival. The non-diluent laboratory control and all test concentrations did meet this criterion. These data are provisionally valid.

TOXICOLOGICAL EVALUATION
OF A TREATED MUNICIPAL EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
August and September 2014

Hull Water Pollution Control Facility
Hull, Massachusetts
NPDES Permit Number MA0101231

1.0 INTRODUCTION

This report presents the results of an acute toxicity test completed on a composite effluent sample collected from the Hull, Massachusetts Water Pollution Control Facility (Hull WPCF), operated by United Water. Testing was based on programs and protocols developed by the US EPA (2002) with exceptions as noted by US EPA Region I (US EPA Region 1, 2012) and involved conducting a 48 hour static acute toxicity test with the inland silverside, *Menidia beryllina*. Testing was performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire in accordance with the provisions of TNI Standards (2009).

Acute toxicity tests involve preparing a series of concentrations by diluting effluent with control water. Groups of test animals are exposed to each effluent concentration and a control for a specified period. In acute tests, mortality data for each concentration are used to calculate (by regression) the median lethal concentration, or LC-50, defined as the effluent concentration which kills half of the test animals. Samples with high LC-50 values are less likely to cause significant environmental impacts. The no-effect concentration is also determined to provide information about the level of effluent which would have minimal acute effects in the environment.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program follow procedures primarily designed by the US EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms (US EPA 2002), and for the analysis of water samples (APHA 2012). See Section 4.0 for a list of references.

2.2 Test Species

When necessary, *M. beryllina* were acclimated to approximate test conditions prior to use in the assay. Test organisms were transferred to test chambers using a large bore glass pipet, minimizing the amount of water added to test solutions. Twenty control fish were weighed during the test to confirm loading rates. The loading rate was below the maximum 0.4 g/L loading rate recommended for assays conducted at 25°C. Fish weights and loading calculations are included in the data appendix.

2.3 Effluent, Receiving Water and Laboratory Water

Effluent and receiving water collection information is provided in Table 1. Samples were stored at 4°C and warmed to 25±1°C prior to preparing test solutions. Effluent used in the *M. beryllina* assay was salinity adjusted to 25±2 ppt using artificial sea salts according to protocol (US EPA 2002). Laboratory water was collected from the Hampton/Seabrook Estuary. This water is classified as SA-1 and has been used to culture marine test organisms since 1981.

Total residual chlorine (TRC) was measured by amperometric titration (MDL 0.02 mg/L) in both the effluent and diluent samples. If chlorine was present, the sample was dechlorinated using sodium thiosulfate and a control assay using laboratory water treated with an equal amount of sodium thiosulfate was run concurrently. Data for the sodium thiosulfate laboratory control can be found in Appendix A.

2.4 Acute Toxicity Test

The 48 hour static acute toxicity test was conducted at 25±1°C with a photoperiod of 16:8 hours light:dark. Test chambers were 250 mL glass beakers containing 200 mL test solution in each of 4 replicates with 10 organisms/replicate. Replicates were not randomized during testing, rather organisms were added randomly at test initiation by replicate across test solutions in an alternating fashion (alternating allocation). Test concentrations for the assay were 100%, 50%, 25%, 12.5%, and 6.25% effluent. Survival and dissolved oxygen were recorded daily in all replicates. Specific conductivity, salinity, temperature, and pH were measured daily in one replicate of each test treatment.

2.5 Data Analysis

When applicable, statistical analysis of acute exposure data was completed using CETIS™ v1.8.6.6, Comprehensive Environmental Toxicity Information System, software. The program computes acute exposure endpoints based on US EPA decision tree guidelines specified in individual test methods. If survival in the highest test concentration is >50%, the LC-50 is obtained by direct observation of the raw data. As needed, the A-NOEC is determined as the highest test concentration which caused no significant mortality.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are completed on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. See Table 2 for details.

3.0 RESULTS AND DISCUSSION

Results of the acute exposure bioassay completed using the inland silverside are summarized in Table 3. Effluent and dilution water characteristics are presented in Table 4. US EPA Region I toxicity test summary sheet can be found after the tables. Support data, including copies of the laboratory bench sheets, are included in Appendix A.

Minimum test acceptability criteria require ≥90% survival in the control concentrations. Achievement of these results indicate that healthy test organisms were used and that the dilution water had no significant adverse impact on the outcome of the assay. See the Executive Summary and Table 3 for test acceptability.

4.0 LITERATURE CITED

APHA. 2012. *Standard Methods for the Examination of Water and Wastewater*, 22nd Edition. Washington D.C.

The NELAC Institute (TNI). 2009. *Environmental Laboratory Sector, Volume 1: Management and Technical Requirements for Laboratories Performing Environmental Analysis (TNI Standard)*. EL-V1-2009.

US EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

US EPA Region I. 2012. *Marine Acute Toxicity Test Procedure and Protocol*. US EPA Region I Office, Boston, Massachusetts. July 2012.

US EPA. 2000. *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)*. EPA 821-B-00-004

TABLE 1. Summary of Sample Collection Information.
Hull WPCF Effluent Biomonitoring Program. September 2014.

Sample Description	Type	Collection Date	Collection Time	Receipt Date	Receipt Time	Arrival Temp °C
Effluent	Comp	09/03-04/14	0800-0800	09/04/14	1045	3
Receiving Water	Grab	09/04/14	0730	09/04/14	1045	3

TABLE 2. Summary of Reference Toxicant Data.
Hull WPCF Effluent Biomonitoring Program. September 2014.

Date		Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
M. beryllina						
08/27/14	Survival	48Hr LC-50	7.2	6.7	5.6 - 7.8	SDS (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays

TABLE 3. Summary of Acute Evaluation Results.
Hull WPCF Effluent Biomonitoring Program. September 2014.

Percent Survival

Species	Exposure	Lab	RW	ST	6.25%	12.5%	25%	50%	100%
M. beryllina	48 hours	97.5%	85%*	87.5%	95%	90%	90%	97.5%	95%

LC-50 and A-NOEC Results

Species	Exposure	Spearman-Karber	Probit	Direct Observation	A-NOEC
M. beryllina	48 Hours	NC	NC	>100%	NC

COMMENTS:
RW - Receiving Water; used as diluent for assay
ST - Sodium thiosulfate adjusted laboratory control water.
NC - Not Calculated.

TABLE 4. Summary of Effluent and Diluent Characteristics. Hull WPCF Effluent Biomonitoring Program. September 2014.

PARAMETER	UNIT	EFFLUENT	RECEIVING WATER
Specific Conductivity - As Received	µmhos/cm	13130	47080
Specific Conductivity - Salinity Adjusted	µmhos/cm	38840	39090
pH - As Received	SU	7.24	7.84
pH - Salinity Adjusted	SU	7.84	7.97
Salinity - As Received	ppt	8	31
Salinity - Salinity Adjusted	ppt	25	25
Total Residual Chlorine	mg/L	2.04*	<0.02
Total Solids	mg/L	8800	36000
Total Suspended Solids	mg/L	11	9
Ammonia as N	mg/L	5.4	<0.1
Total Organic Carbon	mg/L	8.5	0.5
Aluminum, total	mg/L	0.022	0.074
Cadmium, total	mg/L	<0.0005	<0.0005
Chromium, total	mg/L	<0.002	<0.002
Copper, total	mg/L	0.016	0.003
Lead, total	mg/L	<0.0005	<0.0005
Nickel, total	mg/L	<0.002	<0.002
Zinc, total	mg/L	0.015	0.002

COMMENTS:
* The effluent total residual chlorine was adjusted down to <0.02 mg/L using sodium thiosulfate prior to use in the assay. Additional water quality and analytical support chemistry data are available in Appendix A.

TOXICITY TEST SUMMARY SHEET

FACILITY NAME: Hull WPCF
NPDES PERMIT NO.: MA0101231
TEST START DATE: 09/05/14
TEST END DATE: 09/07/14

TEST TYPE	TEST SPECIES	SAMPLE TYPE	SAMPLE METHOD
X Acute	___ *Pimephales promelas*	___ Prechlorinated	___ Grab
___ Chronic	___ *Ceriodaphnia dubia*	___ Dechlorinated	X Composite
___ Modified Chronic (Reporting Acute Values)	___ *Daphnia pulex*	___ Chlorine Spiked in Lab	___ Flow-thru
	___ *Americamysis bahia*	X Chlorinated on Site	___ Other
___ 24 Hour Screen	___ *Cyprinodon variegatus*	___ Unchlorinated	
	X *Menidia beryllina*	___ No Detectable Chlorine Upon Receipt	
	___ *Arbacia punctulata*	___ Dechlorinated at lab	
	___ *Champia parvula*		
	___ *Selenastrum capricornutum*		

DILUTION WATER:

X Receiving water collected at a point upstream or away from the discharge, free from toxicity or other sources of contamination; Receiving Water Name: Massachusetts Bay

___ Alternate surface water of known quality and hardness, to generally reflect the characteristics of the receiving water; Receiving Water Name: _____

___ Synthetic water prepared using either Millipore Milli-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water.

___ Artificial sea salts mixed with deionized water

___ Deionized water and hypersaline brine

___ Other

EFFLUENT SAMPLING DATES: 09/03-04/14 _____ _____ _____

EFFLUENT CONCENTRATIONS TESTED (%): 6.25; 12.5; 25.0; 50.0; 100

Permit Limit Concentration: ≥100 %

Was the effluent salinity adjusted? Yes If yes, to what level? 25 ppt

REFERENCE TOXICANT TEST DATE: 08/27/14 LC-50: 7.2 mg/L Sodium Dodecyl Sulfate

PERMIT LIMITS AND TEST RESULTS

Test Acceptability Criteria

Mean Control Survival: 85%

LIMITS		**RESULTS**	
LC-50:	≥100 %	LC-50	>100 %
		Upper Limit:	- %
A-NOEC:	- %	Lower Limit:	- %
		Method:	Direct Observation
C-NOEC:	- %	A-NOEC:	- %
		C-NOEC:	- %
		LOEC:	-
IC- ___	- %	IC- ___	- %

APPENDIX A

DATA SHEETS

STATISTICAL SUPPORT

METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-012 2002.0
Daphnia pulex	EPA-821-R-02-012 2021.0
Pimephales promelas	EPA-821-R-02-012 2000.0
Americamysis bahia	EPA-821-R-02-012 2007.0
Menidia beryllina	EPA-821-R-02-012 2006.0
Cyprinodon variegatus	EPA-821-R-02-012 2004.0
Chronic Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-013 1002.0
Pimephales promelas	EPA-821-R-02-013 1000.0
Cyprinodon variegatus	EPA-821-R-02-014 1004.0
Menidia beryllina	EPA-821-R-02-014 1006.0
Arbacia punctulata	EPA-821-R-02-014 1008.0
Champia parvula	EPA-821-R-02-014 1009.0
Trace Metals:	
Trace Metals	EPA 200.8/SW 6020, EPA 245.7
Hardness	Standard Methods 22nd Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 22nd Edition - Method 4500-Cl D
Total Organic Carbon	Standard Methods 22nd Edition - Method 5310 C
Specific Conductance	Standard Methods 22nd Edition - Method 2510 B
Nitrogen - Ammonia	Standard Methods 22nd Edition - Method 4500-NH_3 G
pH	Standard Methods 22nd Edition - Method 4500-H+ B
Solids, Total (TS)	Standard Methods 22nd Edition - Method 2540 B
Solids, Total Dissolved (TDS)	Standard Methods 22nd Edition - Method 2540 C
Solids, Total Suspended (TSS)	Standard Methods 22nd Edition - Method 2540 D
Dissolved Oxygen	Standard Methods 22nd Edition - Method 4500-O G

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ACUTE BIOASSAY DATA SUMMARY

9/7 (E3) EH

STUDY: 25062	Brine Shrimp: A-~~3764~~ A-3714	"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES								
CLIENT: United Water	TEST ORGANISM: *M. beryllina*		T. Metals	TOC	AMM	TS/TSS	pH	S/C	SALINITY	TRC
SAMPLE: Hull WWTF Effluent	ORGANISM SUPPLIER / BATCH / AGE: *See Organism Culture Sheet*	EFF	002	003	004	005	7.24	13130	7.6	2.04
DILUENT: Receiving Water		DIL	007	008	009	010	7.84	47080	30.6	<0.02

SALINITY ADJUSTMENT RECORD : 4,000 ML EFFLUENT + 80 G SEA SALTS (A-3700) = 100% ACTUAL PERCENTAGE
8,000 ml RW + 2,000 ml DI H2O = 80 % Actual Percentage

CONC	REP	SURVIVAL 0	24	48	DO (mg/L) 0	24	48	pH (SU) 0	24	48	TEMP (°C) 0	24	48	S/C (µmhos/cm) 0	24	48	SALINITY (ppt) 0	24	48
LAB	A	10	10	9	7.5	6.0	6.4	8.01	7.85	7.88	22	23	23	38260	39420	39770	24	25	25
	B	10	10	10	7.5	5.9	6.3												
	C	10	10	10	7.5	5.9	6.2												
	D	10	10	10	7.5	5.8	6.2												
RW	A	10	10	9	8.3	5.9	6.2	7.93	7.81	7.86	21	24	23	39090	39670	39810	25	25	25
	B	10	10	7	8.3	5.9	6.2												
	C	10	10	9	8.3	5.8	6.3												
	D	10	10	9 (9/7 E3)	8.3	5.8	6.2												
6.25%	A	10	10	8 (10 E3)	8.1	5.8	6.3	7.91	7.79	7.85	21	24	23	38950	39600	39800	25	25	25
	B	10	10	10	8.1	5.8	6.2												
	C	10	10	8	8.1	5.8	6.2												
	D	10	10	10	8.1	5.7	6.2												
12.5%	A	10	10	8	8.0	5.7	6.2	7.90	7.82	7.88	22	24	23	39090	39610	40050	25	25	26
	B	10	10	8	8.0	5.6	6.2												
	C	10	10	10	8.0	5.6	6.0												
	D	10	10	10	8.0	5.7	6.1												
DATE		09/05/14	09/06	09/07	09/05/14	09/06	9/7												
TIME		1315	1320	1130	~~1215~~ 1200	1220	1110												
INITIALS		BL	BL	EH	BL	BL	EH												

(E3) BL 9/7

EH 9/7
(E2)

ACUTE BIOASSAY DATA SUMMARY

STUDY: 25062	Brine Shrimp: A- ~~3764~~ A-3714	
CLIENT: United Water	TEST ORGANISM: *M. beryllina*	
SAMPLE: Hull WWTF Effluent	ORGANISM SUPPLIER / BATCH / AGE: *See Organism Culture Sheet*	
DILUENT: Receiving Water		

CONC	REP	SURVIVAL 0	SURVIVAL 24	SURVIVAL 48	DO (mg/L) 0	DO (mg/L) 24	DO (mg/L) 48	pH (SU) 0	pH (SU) 24	pH (SU) 48	TEMP (°C) 0	TEMP (°C) 24	TEMP (°C) 48	S/C (µmhos/cm) 0	S/C (µmhos/cm) 24	S/C (µmhos/cm) 48	SALINITY (ppt) 0	SALINITY (ppt) 24	SALINITY (ppt) 48
25%	A	10	10	10	8.0	5.8	6.0	7.87	7.82	7.86	22	24	23	39050	39560	39530	25	25	25
	B	10	10	8	8.0	5.6	6.0												
	C	10	10	10	8.0	5.7	6.0												
	D	10	10	8	8.0	5.7	6.0												
50%	A	10	10	10	8.0	5.7	5.7	7.83	7.87	7.89	22	24	23	39510	39570	40290	25	25	26
	B	10	10	10	8.0	5.5	5.6												
	C	10	10	10	8.0	5.4	5.5												
	D	10	9	9	8.0	5.4	5.5												
100%	A	10	10	10	8.5	5.5	5.3	7.78	7.89	7.98	22	24	23	39840	39340	39940	25	25	25
	B	10	10	9	8.5	5.2	5.1												
	C	10	10	9	8.5	4.9	5.1												
	D	10	10	10	8.5	4.9	5.1												
DATE		09/05/14	09/06	09/07	09/05/14	09/06	09/07												
TIME		1315	1320	1130	~~1200~~ 1215	1220	1110												
INITIALS		BL	BL	EH	BL	BL	EH												

(E3)
BL
9/05/14

Organism Wet Weights

Study: 25062
Date/Time/Intials: 9/5/2014/1530/DH
Start/End?: START
Instrument Used: Fisher Accu - 225D 17008376

Rep	
1	0.00259
2	0.00197
3	0.0019
4	0.00155
5	0.00283
6	0.00259
7	0.00242
8	0.00181
9	0.00204
10	0.00143
11	0.00178
12	0.0012
13	0.00112
14	0.00176
15	0.0014
16	0.00181
17	0.0016
18	0.00255
19	0.00204
20	0.00262

Mean Weight (g): 0.0019505
Test Volume (L): 0.2
Loading Rate(g/L) 0.097525

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

08MDABSC9CH14

ORGANISM HISTORY

DATE: 9/3/2014

SPECIES: *Menidia beryllina*

AGE: 8 day

LIFE STAGE: Juvenile

HATCH DATE: 8/26/2014

BEGAN FEEDING: Immediately

FOOD: Rotifers, *Artemia* sp.

Water Chemistry Record:	**Current**	**Range**
TEMPERATURE:	25°C	23-26 °C
SALINITY/CONDUCTIVITY:	25 ppt	23-26 ppt
TOTAL HARDNESS (as $CaCO_3$):	--	--
TOTAL ALKALINITY (as $CaCO_3$):	150mg/l	150-210 mg/l
pH:	8.20	7.86-8.20

Comments:

Facility Supervisor

SODIUM THIOSULFATE CONTROL

STUDY: 25062	
CLIENT: United Water	TEST ORGANISM: *M. beryllina*
SAMPLE: HOLC Sodium Thiosulfate Control	ORGANISM SUPPLIER / BATCH / AGE: *See Organism Culture Sheet*

	REP	SURVIVAL 0	SURVIVAL 24	SURVIVAL 48	DO (mg/L) 0	DO (mg/L) 24	DO (mg/L) 48	pH (SU) 0	pH (SU) 24	pH (SU) 48	TEMP (°C) ‡ 0	TEMP (°C) ‡ 24	TEMP (°C) ‡ 48	SALINITY (ppt) 0	SALINITY (ppt) 24	SALINITY (ppt) 48
Sodium Thiosulfate Control	A	10	10	7	8.8	5.8	5.7	7.99	7.78	7.89	21	23	23	25	25	25
	B	10	10	10	8.8	5.7	5.9									
	C	10	10	10	8.8	5.6	5.9									
	D	10	10	8	8.8	5.6	5.9									
DATE		09/05/14	09/06	09/07	09/05/14	09/06	09/07									
TIME		1315	1320	1130	1215	1220	1110									
INITIALS		BL	BL	EH	BL	BL	EH									

‡ - Temperature in vessel.

TRC of sample	Volume adjusted	Sodium Thiosulfate (mL) added	Sodium Thiosulfate Control ID	Initials	Date
2.04 mL	4,000	~~4.28~~ mL	C-7506	CS	9/4/14

1.9 (E3) CS 9/4/14

RECORD OF METERS USED

STUDY: 25062	CLIENT: United Water - Hull, MA WWTF		
	Exposure (Hours)		
	0	24	48
Water Quality Station #	1	1	1
Initials / Date	BL 09/05/14	BL 09/06	EH 09/07

Water Quality Station #1		Water Quality Station #2	
DO meter #	24	DO meter #	
DO probe #	93	DO probe #	
pH meter #	1097	pH meter #	
pH probe #	126	pH probe #	
S/C meter #	YSI30E	S/C meter #	
S/C probe #	↓	S/C probe #	
Salinity meter #	↓	Salinity meter #	

COMMENTS

PREPARATION OF DILUTIONS

Diluent: Receiving Water (RW)	Day: 0 Sample: E_0, D_0	
Concentration %	Vol. Eff.(mls)	Final Vol.(mls)
Lab	0	800
RW	0	↓
6.25%	50	
12.5%	100	
25%	200	
50%	400	
100%	800	
INITIALS:	BL	
TIME:	1205	
DATE:	09/05/14	

Report No: 25062 SDG:
Project: Hull

Sample ID: Effluent Start
Matrix: Water
Sampled: 09/04/14 0800

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	25062-005	8800	33.33333	mg/L	09/09/14 1005	09/11/14 1015	BG /SM2540B
Total suspended solids	25062-005	11	1.3	mg/L	09/09/14 1040	09/09/14 1400	BG /SM 2540D
Total organic carbon	25062-003	8.5	0.4	mg/L	09/11/14	09/11/14	MG /SM 5310 C
Ammonia-N	25062-004	5.4	0.1	mg/L as N	09/11/14 1056	09/11/14 1056	MG /SM 4500-NH3 G
Aluminum, total	25062-002	0.022	0.02	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Cadmium, total	25062-002	ND	0.0005	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Calcium, total	25062-002	110	0.05	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Chromium, total	25062-002	ND	0.002	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Copper, total	25062-002	0.016	0.002	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Lead, total	25062-002	ND	0.0005	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Magnesium, total	25062-002	240	0.05	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Nickel, total	25062-002	ND	0.002	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Zinc, total	25062-002	0.015	0.002	mg/L	09/09/14	09/10/14	JLH/EPA 200.8

Sample ID: Receiving Water Start
Matrix: Water
Sampled: 09/04/14 0730

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	25062-010	36000	100	mg/L	09/09/14 1005	09/11/14 1015	BG /SM2540B
Total suspended solids	25062-010	9	1.3	mg/L	09/09/14 1040	09/09/14 1400	BG /SM 2540D
Total organic carbon	25062-008	0.5	0.4	mg/L	09/11/14	09/11/14	MG /SM 5310 C
Ammonia-N	25062-009	ND	0.1	mg/L as N	09/11/14 1057	09/11/14 1057	MG /SM 4500-NH3 G
Aluminum, total	25062-007	0.074	0.02	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Cadmium, total	25062-007	ND	0.0005	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Calcium, total	25062-007	360	0.3	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Chromium, total	25062-007	ND	0.002	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Copper, total	25062-007	0.003	0.002	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Lead, total	25062-007	ND	0.0005	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Magnesium, total	25062-007	1100	0.3	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Nickel, total	25062-007	ND	0.002	mg/L	09/09/14	09/10/14	JLH/EPA 200.8
Zinc, total	25062-007	0.002	0.002	mg/L	09/09/14	09/10/14	JLH/EPA 200.8

Notes:

ND = Not Detected

ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	25062		
SDG No:	Hull		
Project:	Hull		
Delivered via:	ESI		
Date and Time Received:	09/04/14 1045	Date and TIme Logged into Lab:	09/04/14 1400
Recieved By:	MW	Logged into Lab by:	CS CS
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	3	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	A1010928		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Effluent Start	25062-001	W	MB48AD StartSample	1x3750 P	4 C	Yes
Effluent Start	25062-002	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Effluent Start	25062-003	W	TOC	1x40 G	H2SO4	Yes
Effluent Start	25062-004	W	NH3;	125 P	H2SO4	Yes
Effluent Start	25062-005	W	TS,TSS	500 P	4 C	Yes
Receiving Water Start	25062-006	W	MB48AD StartDiluent	2x3750 P	4 C	Yes
Receiving Water Start	25062-007	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Receiving Water Start	25062-008	W	TOC	1x40 G	H2SO4	Yes
Receiving Water Start	25062-009	W	NH3;	125 P	H2SO4	Yes
Receiving Water Start	25062-010	W	TS,TSS	500 P	4 C	Yes

Notes and qualifications:

ESI

EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 25062

CHAIN OF CUSTODY DOCUMENTATION

Client: United Water - Hull	Contact: ~~Joe Messier~~ Terri OCallaghan	Project Name: United Water - Hull WWTF	
Report to: ~~Joe Messier~~ Terri OCallaghan	Address: 1111 Nantasket Avenue	Project Number: P0036	Task: 0001
Invoice to: Joe Messier	Address: Hull, MA 02045	Project Manager: ~~Joe Messier~~ Terri OCallaghan	
Voice: 781-925-0906	Fax: 781-925-3056	email: joseph.messier@unitedwater.co	P.O.No: ' Quote No:41181

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
001	Effluent Start	9/3-4/14	8A-8A		C	1	3750	P	4 C	Water	N	MB48AD StartSample
002	Effluent Start	9/3-4/14	8A-8A		C	1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
003	Effluent Start	9/3-4/14	8A-8A		C	1	40	G	H2SO4	Water	N	TOC
004	Effluent Start	9/3-4/14	8A-8A		C	1	125	P	H2SO4	Water	N	NH3;
005	Effluent Start	9/3-4/14	8A-8A		C	1	500	P	4 C	Water	N	TS,TSS
006	Receiving Water Start	9/4/14	7:30A		G	2	3750	P	4 C	Water	N	MB48AD StartDiluent
007	Receiving Water Start	9/4/14	7:30A		G	1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
008	Receiving Water Start	9/4/14	7:30A		G	1	40	G	H2SO4	Water	N	TOC
009	Receiving Water Start	9/4/14	7:30A		G	1	125	P	H2SO4	Water	N	NH3;
010	Receiving Water Start	9/4/14	7:30A		G	1	500	P	4 C	Water	N	TS,TSS

Relinquished By: Joe Bradley Date: 9/4/14 Time: 10:45A Received By: Date: 9/4/14 Time: 1045

Relinquished By: Date: Time: Received at Lab By: Date: Time:

Comments: 3°C

ERR

COC Number: A1010928

Sample Delivery Group No: Sept 2014 Page of

Assay Review Checklist

DATE IN: 09/04/14
DATE DUE: 10/10/14

STUDY#: 25062
CLIENT: United Water
PROJECT: HUN
ASSAY: MB48AD redo

Project Paperwork Check for Completeness			
	Date	Initials	Comments
Day 0	09/05/14	BC	
Day 1	09/06	BC	
Day 2	09/07	EH	
Day 3			
Day 4			
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	09/09/14	EH	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)	↓	↓	
Bench Sheets Complete (dates, times, initials, etc...)	↓	↓	
Water Quality Data Complete	↓	↓	
TRC Values & Bottle Numbers	↓	↓	
Daphnid Calculations Complete	NA	NA	
Weights Reported	09/09/14	EH	
Assay Acceptability Review	↓	↓	

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	—	—	
Statistical Analysis Reviewed	—	—	
Data Acceptability Review	9/9/14	↓	
Supporting Chemistry Report	9/12/14	↓	
Draft Report	9/9/14	↓	
QA Audit/Review Complete			
Final Report Reviewed	9/11/14	CS	
Final Report Printed - PDF	9/12/14	↓	
Executive Summary / Chems Sent	9/12/14	↓	
Report E-mailed / Faxed	↓	↓	
Report Logged Out / Invoice Sent	↓	↓	
Report Scanned to Archive	↓	↓	

Non-Compliant Assay Bench Sheets and Support

Menidia beryllina
August 8, 2014

Total Pages (Including this page) = 11

ACUTE BIOASSAY DATA SUMMARY

STUDY: 24925 | Brine Shrimp: A-34131 | TEST ORGANISM: *M. beryllina*

CLIENT: United Water | SAMPLE: Hull WWTF Effluent | DILUENT: Receiving Water | ORGANISM SUPPLIER / BATCH / AGE: *See Organism Culture Sheet*

"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES

	T. Metals	TOC	AMM	TS/TSS	pH	S/C	SALINITY	TRC
EFF	002	003	004	005	7.12	13040	7.8	0.492
DIL	007	008	009	010	7.94	46280	30.6	0.02

SALINITY ADJUSTMENT RECORD : 4000 ML EFFLUENT + 79 G SEA SALTS (A-) = 100% ACTUAL PERCENTAGE
8000 mL RedD + 16000 mL water (DI) = 93%

CONC	REP	SURVIVAL 0	24	48	DO (mg/L) 0	24	48	pH (SU) 0	24	48	TEMP (°C) 0	24	48	S/C (µmhos/cm) 0	24	48	SALINITY (ppt) 0	24	48
LAB	A	10	10	5	7.5	7.5	6.4	8.05	7.91	8.00	22	23	24	39710	42980		26	27	28
	B	10	10	8	7.5	7.6	6.4												
	C	10	10	7	7.5	7.5	6.3												
	D	10	10	6	7.5	7.6	6.4												
RW	A	10	10	4	7.7	7.6	6.3	7.95	7.89	7.99	22	23	24	40020	42130		26	27	28
	B	10	10	8	7.7	7.8	6.4												
	C	10	10	10	7.7	7.8	6.3												
	D	10	10	10	7.7	7.8	6.3												
6.25%	A	10	10	6	7.8	7.6	6.5	7.93	7.90	7.99	22	22	24	39930	41680		26	27	28
	B	10	10	8	7.8	7.7	6.4												
	C	10	10	10	7.8	7.8	6.4												
	D	10	8	8	7.8	7.8	6.5												
12.5%	A	10	10	10	7.8	7.4	6.5	7.91	7.81	7.95	22	22	24	39810	41270		25	26	28
	B	10	10	10	7.8	7.3	6.5												
	C	10	10	10	7.8	7.2	6.6												
	D	10	10	10	7.8	7.4	6.5												
DATE		8/8/14	8/9	8/10	8/8/14	8/9	8/10												
TIME		1435	1455	1440	1155	1440	1435												
INITIALS		KW	CS	BP	CS	CS	BP												

ACUTE BIOASSAY DATA SUMMARY

STUDY: 24925	Brine Shrimp: A-3431	
CLIENT: United Water	TEST ORGANISM: *M. beryllina*	
SAMPLE: Hull WWTF Effluent	ORGANISM SUPPLIER / BATCH / AGE: *See Organism Culture Sheet*	
DILUENT: Receiving Water		

CONC	REP	SURVIVAL 0	SURVIVAL 24	SURVIVAL 48	DO (mg/L) 0	DO (mg/L) 24	DO (mg/L) 48	pH (SU) 0	pH (SU) 24	pH (SU) 48	TEMP (°C) 0	TEMP (°C) 24	TEMP (°C) 48	S/C (µmhos/cm) 0	S/C (µmhos/cm) 24	S/C (µmhos/cm) 48	SALINITY (ppt) 0	SALINITY (ppt) 24	SALINITY (ppt) 48
25%	A	10	10	9	7.7	7.4	6.0	7.87	7.92	8.01	22	23	≥4	39350	40540		25	26	≥7
	B	10	10	10	7.7	7.5	6.1												
	C	10	10	9	7.7	7.5	6.1												
	D	10	10	7	7.7	7.5	6.1			8.01									
50%	A	10	10	8	7.7	7.5	6.0	7.80	7.94	~~8.08~~	23	23	≥4	39090	40200		25	26	≥6
	B	10	10	9	7.7	7.4	6.0			(8.13) BP									
	C	10	10	10	7.7	7.4	6.0			8/10									
	D	10	10	10	7.7	7.3	6.1												
100%	A	10	10	5	7.7	7.3	6.0	7.68	7.99	8.10	24	23	≥4	38170	39290		24	25	≥6
	B	10	10	10	7.7	7.4	6.0												
	C	10	10	7	7.7	7.3	6.1												
	D	10	10	9	7.7	7.2	6.1												
DATE		8/8/14	8/9	8/10	8/8/14	8/9	8/10												
TIME		1435	1455	1440	1155	1440	1435												
INITIALS		KL	CS	BP	CS	CS	BP												

Organism Wet Weights

Study: 24925
Date/Time/Intials: 08/10/14 1445 BP
Start/End?: END
Instrument Used: Fisher Accu - 225D 17008376

Rep	
1	0.0005
2	0.00187
3	0.00079
4	0.00244
5	0.00112
6	0.00051
7	0.00063
8	0.00117
9	0.00167
10	0.00058
11	0.00079
12	0.00089
13	0.0012
14	0.00036
15	0.00061
16	0.00067
17	0.00043
18	0.00041
19	0.00036
20	0.0006

Mean Weight (g):	0.00088
Test Volume (L):	0.2
Loading Rate(g/L)	0.044

09MbAR0080614

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Menidia beryllina

Source: Lab reared ✓ Hatchery reared _____ Field collected _____

Hatch date 7-28-14 Receipt date _____

Lot number 072514MB Strain _____

Brood origination Cape Cod MA

II. Water Quality

Temperature 25 °C Salinity ~28 ppt D.O. ~ ppm

pH 7.8 su Hardness ~ ppm Alkalinity ~ ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating ✓ Flow through _____ Static renewal _____

DIET: Flake food ✓ Phytoplankton _____ Trout chow _____

Artemia ✓ Rotifers ✓ YCT _____ Other Eu cap. Shrimp Diet

Prophylactic treatments: _____

Comments: _____

_____

IV. Shipping Information

Client: EST # of Organisms 640+

Carrier: _____ Date shipped 8-6-14

Biologist: Mark Rosenzweig

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

SODIUM THIOSULFATE CONTROL

STUDY: 24925	
CLIENT: Hull	TEST ORGANISM: *M. beryllina*
SAMPLE: Sodium Thiosulfate Control	ORGANISM SUPPLIER / BATCH / AGE: *See Organism Culture Sheet*

	REP	SURVIVAL 0	SURVIVAL 24	SURVIVAL 48	DO (mg/L) 0	DO (mg/L) 24	DO (mg/L) 48	pH (SU) 0	pH (SU) 24	pH (SU) 48	TEMP (°C) ‡ 0	TEMP (°C) ‡ 24	TEMP (°C) ‡ 48	SALINITY (ppt) 0	SALINITY (ppt) 24	SALINITY (ppt) 48
Sodium Thiosulfate Control	A	10	10	9	7.5	7.3	6.1	8.05	7.88	7.91	22	23	24	25	26	26
	B	10	10	5	7.5	7.2	6.0									
	C	10	10	10	7.5	7.3	6.1									
	D	10	10	9	7.5	7.4	6.1									
DATE		8/8/14	8/9	8/10	8/8/14	8/9	8/10									
TIME		1435	1455	1440	1155	1440	1435									
INITIALS		KL	CS	BP	CS	CS	BP									

‡ - Temperature in vessel.

TRC of sample	Volume adjusted	Sodium Thiosulfate (mL) added	Sodium Thiosulfate Control ID	Initials	Date
0.159	3,000mL	0.24 mL	C-7426	CS	8/8/14

RECORD OF METERS USED

STUDY: 24925	CLIENT: United Water - Hull, MA WWTF		
Exposure (Hours)			
	0	24	48
Water Quality Station #	1	1	1
Initials / Date	CS 8/8/14	CS 8/9	BP 8/10

Water Quality Station #1		Water Quality Station #2		COMMENTS
DO meter #	24	DO meter #		
DO probe #	93	DO probe #		
pH meter #	1097	pH meter #		
pH probe #	126	pH probe #		
S/C meter #	XS1300	S/C meter #		
S/C probe #	↓	S/C probe #		
Salinity meter #	↓	Salinity meter #		

PREPARATION OF DILUTIONS

Diluent: Receiving Water (RW)	Day: 0 Sample: EO, DO	
Concentration %	Vol. Eff.(mls)	Final Vol.(mls)
Lab	0	800
RW	0	↓
6.25%	50	
12.5%	100	
25%	200	
50%	400	
100%	800	↓
INITIALS:	CS	
TIME:	1150	
DATE:	8/8/14	

Report No: 24925 SDG:
Project: Hull

Sample ID: Effluent Start
Matrix: Water
Sampled: 08/07/14 0800

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	24925-005	8600	50	mg/L	08/09/14 1000	08/11/14 0810	JTP/SM2540B
Total suspended solids	24925-005	8.8	1.3	mg/L	08/08/14 1040	08/08/14 1320	JTP/SM 2540D
Total organic carbon	24925-003	8.9	0.4	mg/L	08/12/14	08/12/14	MG /SM 5310 C
Ammonia-N	24925-004	0.75	0.1	mg/L as N	08/08/14 1217	08/08/14 1217	MG /SM 4500-NH3 G
Aluminum, total	24925-002	ND	0.02	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Cadmium, total	24925-002	ND	0.0005	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Calcium, total	24925-002	110	0.05	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Chromium, total	24925-002	ND	0.002	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Copper, total	24925-002	0.018	0.002	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Lead, total	24925-002	ND	0.0005	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Magnesium, total	24925-002	250	0.05	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Nickel, total	24925-002	ND	0.002	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Zinc, total	24925-002	0.034	0.002	mg/L	08/25/14	08/25/14	JLH/EPA 200.8

Sample ID: Receiving Water Start
Matrix: Water
Sampled: 08/07/14 0730

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	24925-010	35000	100	mg/L	08/09/14 1000	08/11/14 0810	JTP/SM2540B
Total suspended solids	24925-010	13	1.3	mg/L	08/08/14 1040	08/08/14 1320	JTP/SM 2540D
Total organic carbon	24925-008	0.5	0.4	mg/L	08/12/14	08/12/14	MG /SM 5310 C
Ammonia-N	24925-009	ND	0.1	mg/L as N	08/08/14 1217	08/08/14 1217	MG /SM 4500-NH3 G
Aluminum, total	24925-007	0.1	0.02	mg/L	08/25/14	08/28/14	JLH/EPA 200.8
Cadmium, total	24925-007	ND	0.0005	mg/L	08/25/14	08/28/14	JLH/EPA 200.8
Calcium, total	24925-007	360	0.3	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Chromium, total	24925-007	ND	0.002	mg/L	08/25/14	08/28/14	JLH/EPA 200.8
Copper, total	24925-007	0.003	0.002	mg/L	08/25/14	08/28/14	JLH/EPA 200.8
Lead, total	24925-007	ND	0.0005	mg/L	08/25/14	08/28/14	JLH/EPA 200.8
Magnesium, total	24925-007	1200	0.3	mg/L	08/25/14	08/25/14	JLH/EPA 200.8
Nickel, total	24925-007	ND	0.002	mg/L	08/25/14	08/28/14	JLH/EPA 200.8
Zinc, total	24925-007	0.003	0.002	mg/L	08/25/14	08/28/14	JLH/EPA 200.8

Notes:

ND = Not Detected

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	24925		
SDG No:	Hull		
Project:	Hull		
Delivered via:	**ESI**		
Date and Time Received:	08/07/14 0900	Date and TIme Logged into Lab:	08/07/14 1342
Recieved By:	MW BL	Logged into Lab by:	BL BL
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	7.8	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	A1010750		
COC Complete:		Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Yes		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Effluent Start	24925-001	W	MB48AD StartSample	1x3750 P	4 C	Yes
Effluent Start	24925-002	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Effluent Start	24925-003	W	TOC	1x40 G	H2SO4	Yes
Effluent Start	24925-004	W	NH3;	125 P	H2SO4	Yes
Effluent Start	24925-005	W	TS,TSS	500 P	4 C	Yes
Receiving Water Start	24925-006	W	MB48AD StartDiluent	2x3750 P	4 C	Yes
Receiving Water Start	24925-007	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Receiving Water Start	24925-008	W	TOC	1x40 G	H2SO4	Yes
Receiving Water Start	24925-009	W	NH3;	125 P	H2SO4	Yes
Receiving Water Start	24925-010	W	TS,TSS	500 P	4 C	Yes

Notes and qualifications:

ESI

EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 24925

CHAIN OF CUSTODY DOCUMENTATION

Client: United Water - Hull	Contact: Joe Messier	Project Name: United Water - Hull WWTF	
Report to: ~~Joe Messier~~ Terri OCallaghan	Address: 1111 Nantasket Avenue	Project Number: P0036	Task: 0001
Invoice to: ~~Joe Messier~~ Terri OCallaghan	Address: Hull, MA 02045	Project Manager: ~~Joe Messier~~ Terri OCallaghan	
Voice: 781-925-0906	Fax: 781-925-3056	email: joseph.messier@unitedwater.co	P.O.No: ' Quote No:41181

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
001	Effluent Start	8/6-7/14	8:00 AM 8:00	TO/93	C	1	3750	P	4 C	Water	N	MB48AD StartSample
002	Effluent Start	8/6-7/14	8A-8A	TO/93	C	1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
003	Effluent Start	8/6-7/14	8A-8A	TO/93	C	1	40	G	H2SO4	Water	N	TOC
004	Effluent Start	8/6-7/14	8A-8A	TO/93	C	1	125	P	H2SO4	Water	N	NH3;
005	Effluent Start	8/6-7/14	8A-8A	TO/93	C	1	500	P	4 C	Water	N	TS,TSS
006	Receiving Water Start	8/7/14	7:30A	TO/93	G	2	3750	P	4 C	Water	N	MB48AD StartDiluent
007	Receiving Water Start	8/7/14	7:30A	TO/93	G	1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
008	Receiving Water Start	8/7/14	7:30A	TO/93	G	1	40	G	H2SO4	Water	N	TOC
009	Receiving Water Start	8/7/14	7:30A	TO/93	G	1	125	P	H2SO4	Water	N	NH3;
010	Receiving Water Start	8/7/14	7:35A	TO/93	G	1	500	P	4 C	Water	N	TS,TSS

Relinquished By: Joe Basler	Date: 8/7/14 Time: 9:00 AM	Received By:	Date: 8/7/14 Time: 9:30
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments: 7.8°C

ERR

COC Number: A1010750

Sample Delivery Group No: July 2014	Page 1 of 1	

Assay Review Checklist

DATE IN: 8/7/14
DATE DUE: 9/10/14

STUDY#: 24925
CLIENT: Hull
PROJECT:
ASSAY: MB48AD

Project Paperwork Check for Completeness			
	Date	Initials	Comments
Day 0	8/8/14	[illegible]	
Day 1	8/9/14	CS	
Day 2	8/10/14	BP	
Day 3			
Day 4			
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	8/21/14	EM	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers	↓	↓	
Daphnid Calculations Complete	NA	NA	
Weights Reported	8/21/14	EM	
Assay Acceptability Review	↓	↓	

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	NA	—	
Statistical Analysis Reviewed	↓	↓	
Data Acceptability Review	↓	↓	
Supporting Chemistry Report	9/12/14	[illegible]	
Draft Report	9/9/14	[illegible]	
QA Audit/Review Complete	~~9/11/14~~	~~CS~~	CS 9/11/14
Final Report Reviewed	9/11/14	CS	
Final Report Printed - PDF	9/12/14	[illegible]	
Executive Summary / Chems Sent	9/12/14	[illegible]	
Report E-mailed / Faxed	↓	↓	
Report Logged Out / Invoice Sent	↓	↓	
Report Scanned to Archive	↓	↓	